240648 - Train, Transport and Technology. From Steam to High Speed

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 749 - MAT - Department of Mathematics
Academic year: 2017
Degree: 
- BACHELOR’S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional)
- BACHELOR’S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2010). (Teaching unit Optional)
- BACHELOR’S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 3
Teaching languages: Catalan

Coordinator: Carles Puig Pla

Degree competences to which the subject contributes

Transversal:
1. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.

Teaching methodology

Presentation sessions of different topics, supplemented by the use of ICT and individual resources
Cooperative learning based on case studies; oral presentations and delivering papers by students
Case studies preparation, based on library resources and web resources

Learning objectives of the subject

- 1. To explain the main contributions of the pioneers of steam engines in Europe and Catalonia.
- 2. To identify major technological progress in railway locomotives at different times and historical contexts.
- 3. To describe the main features of the history of the construction of the railway network in Spain and Catalonia.
- 4. To recognize the most significant changes that have contributed to the development of rail transport from the nineteenth to the twenty-first century.
- 5. To explain the most important characteristics of high-speed and magnetic levitation railway.
- 6. To use library resources and the Internet to find study materials related to the history of transportation and railway technology.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 75h</th>
<th>Hours large group: 0h</th>
<th>0.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>30h</td>
<td>40.00%</td>
<td></td>
</tr>
<tr>
<td>0h</td>
<td>0.00%</td>
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</tr>
<tr>
<td>45h</td>
<td>60.00%</td>
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</tbody>
</table>

Total learning time: 75h
Hours large group: 0h
Hours medium group: 30h
Hours small group: 0h
Guided activities: 0h
Self study: 45h
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## Content

<table>
<thead>
<tr>
<th>Item 1. - The steam engine</th>
<th>Learning time: 15h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Self study: 9h</td>
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</tbody>
</table>

### Description:

### Related activities:
Apart from the theoretical introduction classes and group activities in class, see below.

### Specific objectives:
The student achieves objectives 1 and 6

<table>
<thead>
<tr>
<th>Item 2. The advent of the railway in Europe and America</th>
<th>Learning time: 15h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td></td>
<td>Self study: 9h</td>
</tr>
</tbody>
</table>

### Description:

### Related activities:
Apart from the theoretical introduction classes and group activities in class, see below.

### Specific objectives:
that students achieve objectives 2 and 6
Item 3. Railway network in Spain

**Description:**

**Related activities:**
Apart from the theoretical introduction classes and group activities in class, see below.

**Specific objectives:**
that students achieve their goals 3 and 6

<table>
<thead>
<tr>
<th>Learning time: 15h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 6h</td>
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<tr>
<td>Self study: 9h</td>
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</table>

Item 4.’s Construction of the railway network in Catalonia

**Description:**
The construction of the railway network in Catalonia. Extension of the line from Mataró to Arenys. From Barcelona to Granollers and successive extensions. From Barcelona to Molins de Rei and Tarragona. Fusion and concentration of railway lines. The Maquinista Terrestre y Marítima Company. The difficult expansion to France, the line of Paris (1878). Electrification of Sarrià Railway. The Mancomunitat and the Network of Secondary Railroads; narrow-gauge railways and rack railway.

**Related activities:**
Apart from the theoretical introduction classes and group activities in class, see below.

**Specific objectives:**
that students achieve their goals 3 and 6

<table>
<thead>
<tr>
<th>Learning time: 15h</th>
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<tbody>
<tr>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td>Self study: 9h</td>
</tr>
</tbody>
</table>
### Item 5. Technological development of high speed train

**Description:**

**Related activities:**
Apart from the theoretical introduction classes and group activities in class, see below.

**Specific objectives:**
that students achieve goals 4, 5 and 6

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### Planning of activities

<table>
<thead>
<tr>
<th>name english</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2h</td>
</tr>
<tr>
<td>Self study:</td>
<td>2h</td>
</tr>
</tbody>
</table>

**Description:**
The students form groups and prepare a work, assigned by teacher, related to the course content and they will expose it in the classroom.

**Support materials:**
Library materials and Web resources

**Descriptions of the assignments due and their relation to the assessment:**
Before finishing classes during the exhibition in accordance with the schedule of exhibitions set (according to the number of groups)

**Specific objectives:**
To achieve good oral and written communication as well as good teamwork and to evaluate objective 6

<table>
<thead>
<tr>
<th>name english</th>
<th>Hours</th>
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<tbody>
<tr>
<td></td>
<td>4h</td>
</tr>
<tr>
<td>Theory classes:</td>
<td>4h</td>
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### Qualification system

The final mark will be the result of 3 test or evaluations. Their respective weightings are:
- T1, T2 & T3: 40%
- T4 & T5: 30%
- Oral presentation 6 delivering paper: 30%
Bibliography

Basic:


Complementary:


Others resources:

Web addresses ICT resources with audiovisual information